

Subject: COMPOSITE OF POLYMER OR CERAMIC MATERIALS AND COMPONENT MADE OF
SUCH A COMPOSITE

CLAIMS

1. Composite of polymer or ceramic material with a content of integrated reinforcing elements in the form of fibers or fibrous parts, for the manufacture of components exposed to tensile, bending, shear, compressive and/or torsional stress for use in implants, e.g., osteosynthesis plates, endoprostheses, screw coupling elements or in surgical instruments, characterized by the fact that polymer or ceramic material incorporates at least a small percentage of the content of reinforcing elements made out of a material whose X-ray absorption is higher than that of the material of the remaining reinforcing elements.

2. Composite according to claim 1, characterized by the fact that it consists of a polymer or ceramic material with a high fiber content, with the predominant use of continuous, long or short fibers.

3. Composite according to claim 1 or 2, characterized by the fact that it is prefabricated as a profiled rod material comprised of thermoplastics with carbon fibers and fibers made out of a material with a higher X-ray absorption, and can be or has been molded into a shape required for the final component (1, 18) in a thermoforming process.

4. Composite according to one of claims 1 to 3, characterized by the fact that it consists of carbon fiber-reinforced PAEK (poly-aryl-ether-ketone) and a percentage of fibers made out of a material with a higher X-ray absorption.

Claim 1

claim 1

A 5. Composite according to one of claims 1 to 4, characterized by the fact that the carbon fibers and fibers made out of a material with higher X-ray absorption are designed as continuous fibers and/or fibers with a length exceeding 3 mm.

claim 1

A 6. Composite according to claims 1 to 5, characterized by the fact that the used fibers (6) are enveloped on the surface by the matrix material both in the preform and the finished component (1, 18).

claim 1

A 7. Composite according to claims 1 to 6, characterized by the fact that the fibers (6) or fibrous parts consist of a material with a higher X-ray absorption made out of a nonmagnetic material.

claim 1

B 8. Composite according to claims 1 to 7, characterized by the fact that the fibers (6) or fibrous parts with a high X-ray absorption consist of tantalum, tungsten, gold or platinum, meaning a metal or metal oxides with high attenuation coefficients.

claim 1

B 9. Component made out of a composite according to claims 1 to 8, characterized by the fact that a predictable progression and predictable quantity and orientation of reinforcing elements in the form of fibers (6) or fibrous parts made out of a material with a high X-ray absorption, are provided, tailored to the shape and application of the component (1, 18).

10. Component according to claim 9, characterized by the fact that areas of differing fiber orientation or fiber progression are provided relative to the longitudinally or transverse oriented alignment of the component (1, 18).

D 11. Component according to claims 9 and 10, characterized by the fact that the ratio of carbon fibers to fibers or fibrous parts made out of a material with a higher X-ray absorption can be or is variable at a total fiber percentage of approx. 50 %v/v, for example, depending on the application requirement.

claim 9

A 12. Component according to claims 9 to 11, characterized by the fact that the total fiber percentage in the composite remains constant over their length or width, but this changes the ratio of carbon fibers

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(6) to fibers (6) or fibrous parts made out of a material with a high X-ray absorption, depending on the application requirement.

A 13. Component in the form of a connecting element according to ~~claims 9 to 12~~, characterized by the fact that the stiffness of the connecting element can be varied by varying the orientation of used fibers (6) from the force application point toward the free end.

A 14. Component in the form of a connecting element according to ~~one of claims 9 to 13~~, characterized by the fact that the stiffness of the component (1) is incrementally or continuously tapered by varying the orientation of the fibers viewed from the force application point to the free end.

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15. Component in the form of a strip or plate assembly part, e.g., an osteosynthesis plate, according to ~~one of claims 9 to 14~~, characterized by the fact that a concentration of fibers (6) be present in the area (A) of one or more recesses (14) or holes in the component (18), wherein the percentage of fibers (6) or fibrous parts made out of a material with a high X-ray absorption is reduced in these areas, if necessary.

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